Southern Pinal County Regional Corridors Study

Working Paper #3
Scenario Development

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1.0 INTRODUCTION

This study examines the needs of the long-term regional transportation infrastructure network within southern Pinal and northern Pima Counties, considering the impacts of planned development. This working paper documents existing socioeconomic conditions, a baseline future scenario using currently adopted plans, and a proposed future scenario that addresses near term planned developments within the study area in terms of location, distribution, and intensity. An understanding of future socioeconomic conditions will create the basis for transportation infrastructure recommendations to address anticipated growth in the region.

2.0 BASELINE SCENARIO AND PROPOSED SCENARIO

Travel forecasts are estimated for future conditions based on population and employment growth projections that build upon existing population and employment conditions. This section describes the scenario development process, the baseline scenario and the proposed scenario utilized for this study. Detail about revisions to the travel demand model as part of this process can be found in the Appendix.

2.1. Baseline Scenario

In summer 2014, CAG completed the development of a regional travel demand model as part of their Regional Transportation Plan (RTP) update. Because the CAG RTP update was concurrent with this study, and overlapped this study area, it was determined that this study should utilize the RTP as the baseline future scenario, referred to as Scenario A in this working paper.

Following protocol as outlined in State Statutes, the CAG RTP update utilized total population and employment estimates within the study area consistent with projections established by the Arizona State Demographer's Office, working with official population estimates and projections for the State of Arizona. The CAG Population Technical Advisory Committee (POPTAC) working group determined the sub-regional distribution of population and employment forecasts at the Traffic Analysis Zone (TAZ) level for the transportation planning process. ADOT's travel demand model (AZTDM) was utilized as the platform for the CAG travel demand model. Figure 1 and Figure 2 depict the existing (2010) population and employment distribution based on AZTDM. Figure 3 and Figure 4 depict the assumption for 2040 population and employment in Scenario A, based on the distribution determined in the CAG RTP update.

Figure 1: Existing (2010) Population

Figure 2: Existing (2010) Employment

Figure 3: Scenario A (CAG RTP 2040) Population

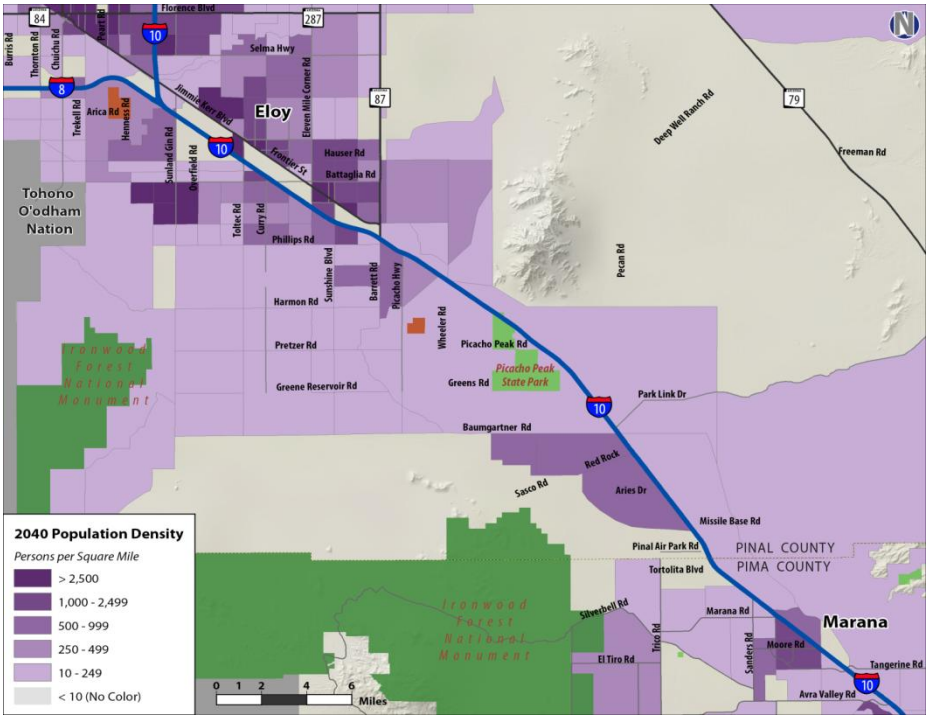
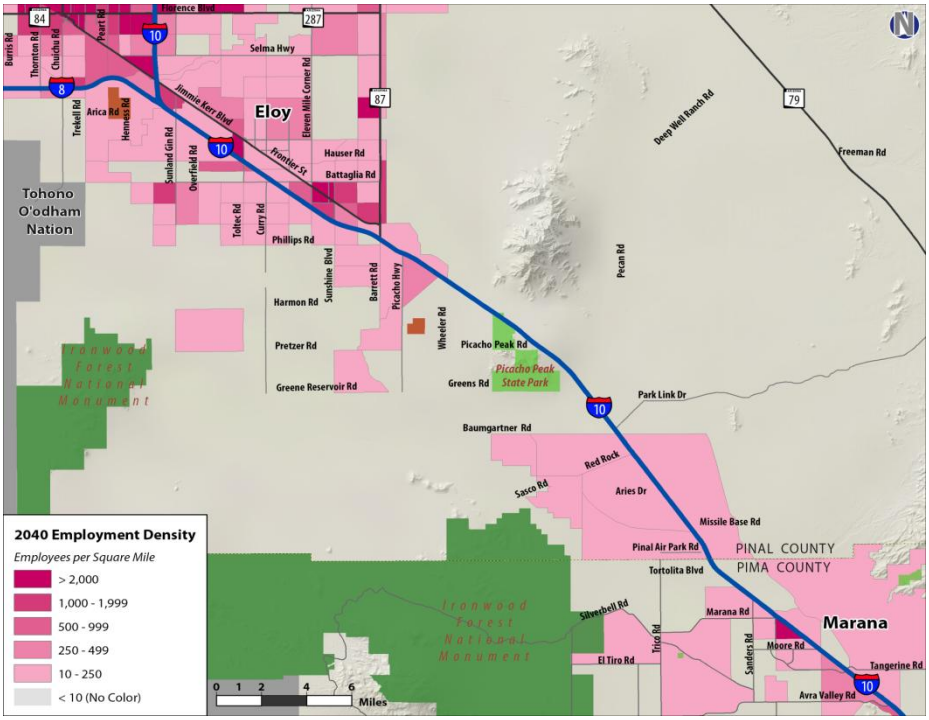


Figure 4: Scenario A (CAG RTP 2040) Employment

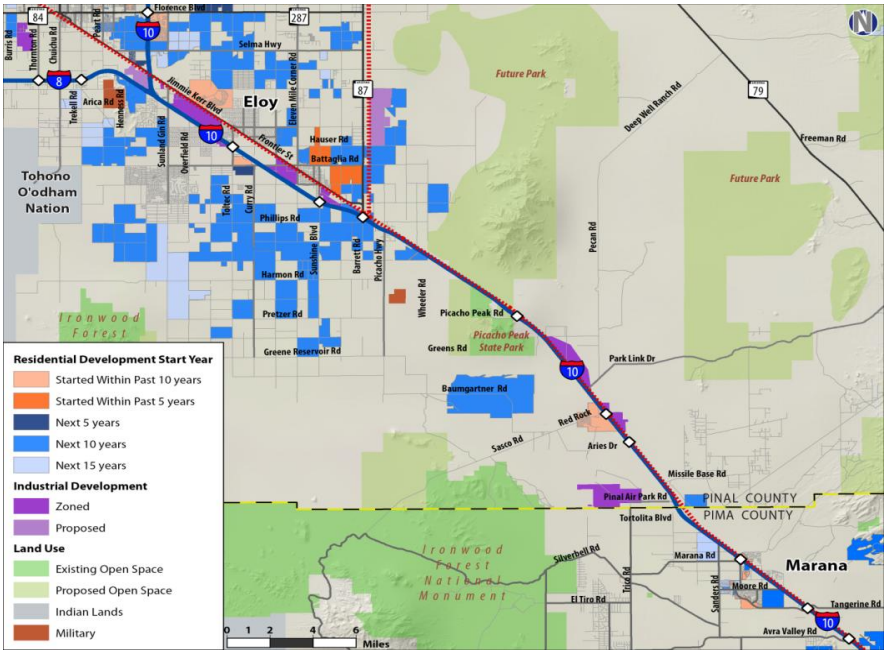


The Technical Working Group (TWG) for this PARA study acknowledged that the CAG RTP update did not account for all of the currently known planned development within the study area. Therefore, the TWG requested that this study develop a future socioeconomic scenario that would address the more than 350 entitled developments and eleven zoned or planned industrial developments within Pinal County.

2.2. Planned Development

A significant number of residential and industrial developments are planned within the study area. Figure 5 depicts the planned residential and industrial development. Residential development is fully entitled and industrial is proposed or zoned.

Figure 5: Planned Development



Working with the TWG and the Pinal County Economic Development Department, this study created a future scenario that quantifies job, population, and household figures for the future condition when all currently identified development is complete.

2.3. Proposed Scenario

A proposed socioeconomic scenario, referred to as Scenario B, was developed as part of this study in order to capture the planned development anticipated beyond that identified as part of the CAG RTP update (Scenario A). Scenario B accounts for known opportunities, including population and employment that may occur beyond the 2040 horizon year. Scenario B should be utilized as population and employment thresholds for future needs, not linked to a specific design year. The population and employment for Scenario B is identified in Figure 6 and Figure 7, respectively.

Figure 6: Scenario B Future Population

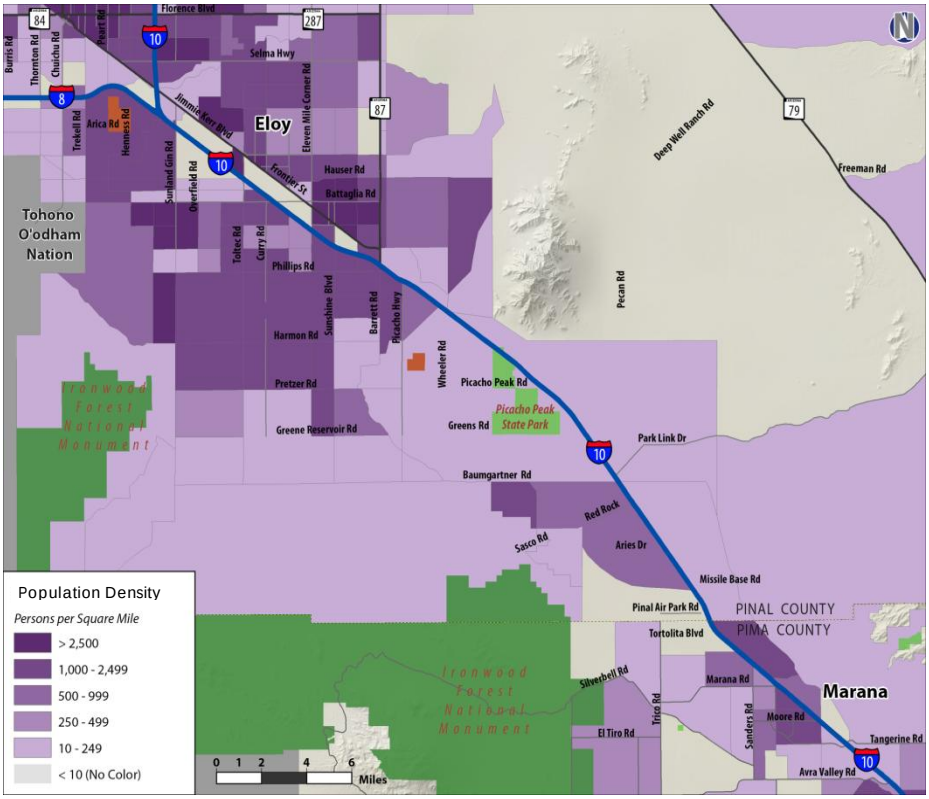
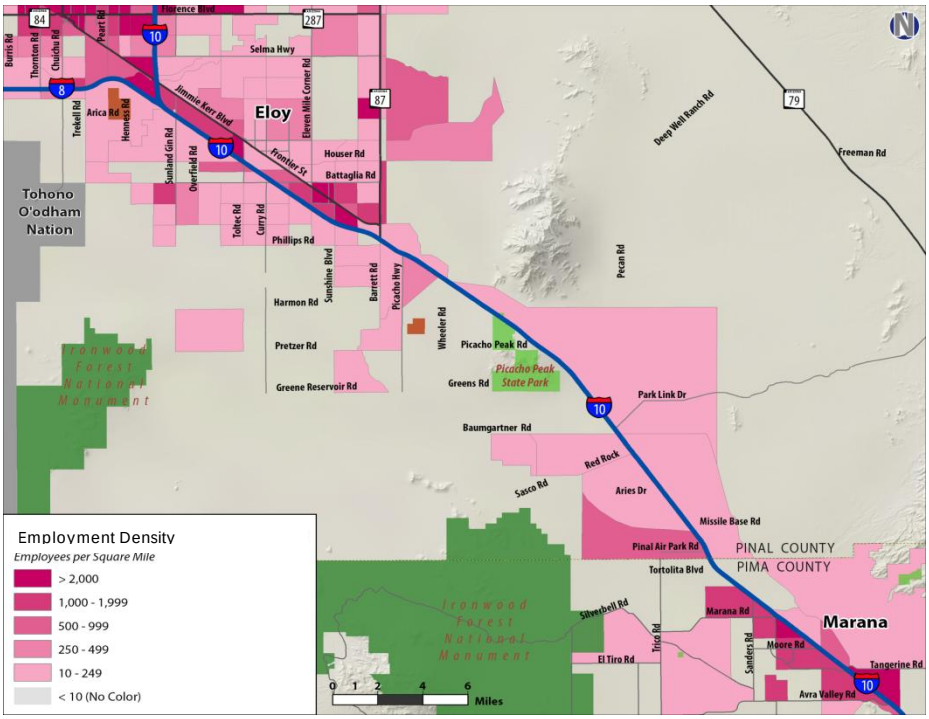


Figure 7: Scenario B Future Employment



3.0 DEMOGRAPHIC TRENDS

The development trends depicted in Scenario B will redistribute population centers in significant ways. This section describes the demographic characteristics of Scenario B within the study area and by focus area, as previously established in Working Paper #2.

3.1. Study Area

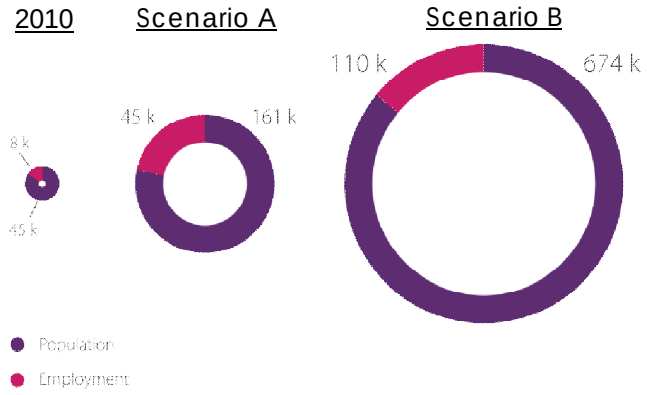
As summarized in Table 1 and Figure 8, the population and employment in Scenario B is a substantial increase over Scenario A. This expansion of population and employment will have significant effects on infrastructure.

Table 1: Study Area Population and Employment, Scenario Comparison

	Existing (2010)	Scenario A (CAG RTP 2040)	Scenario B (CAG RTP 2040 + Additional Development)*
Population	45,000	161,000	674,000
Employment	8,000	45,000	110,000

*Additional development may occur beyond the 2040 horizon year. Population and employment projections should be utilized as thresholds for needed infrastructure improvements, instead of being linked to a specific year.

Figure 8: Study Area Population and Employment, Scenario Comparison



The population projected in Scenario B is based on build-out of the residential development identified to have start years by 2040. The population assumes build-out of these housing developments, which may occur after 2040.

While close to 100,000 jobs will be the result of new economic opportunities for residents, it is anticipated that employment growth will lag residential growth, which follows typical development trends. When a large mismatch exists between housing and employment, called the jobs-to-housing ratio, significant pressure on the transportation system may occur due to the need to travel long distances for work. In this case, within

the study area, due to the jobs-to-housing ratio depicted in Figure 8, there will be continued demand on the transportation network for longer distance works trips, although it should be noted that a major employment center of Casa Grande is located slightly outside the study area.

3.2. Comparisons by Focus Area

Six key focus areas within the study area were identified in Working Paper #2. These locations, depicted in Figure 9, help to understand trends within each specific area, thus providing insights into potential real estate submarkets and associated infrastructure needs. Full details on the geographic limits used for purposes of analysis are described in Working Paper #2.

Figure 9: Focus Areas

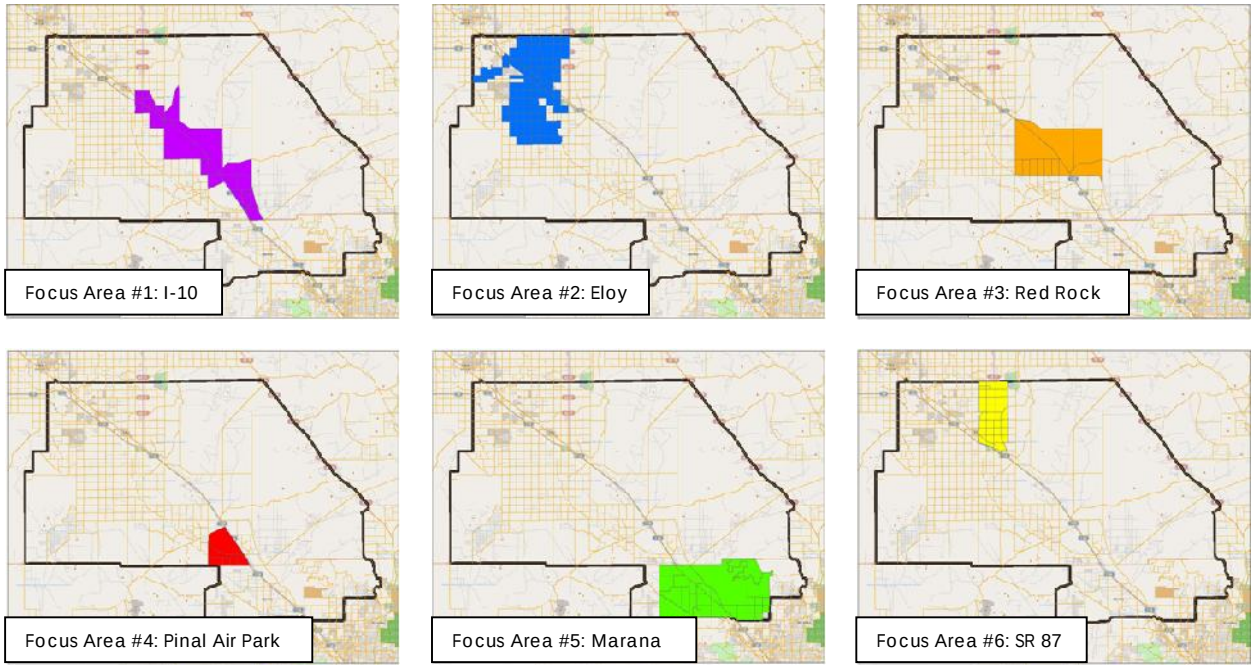


Figure 10 and Figure 11 summarize the anticipated population and employment by focus area. The anticipated housing growth is strongest within the incorporated area of Eloy, with more than one-third of all future development. Future employment is highest in Marana, followed by the Eloy and the SR 87 Corridor focus areas.

Figure 10: Population by Scenario

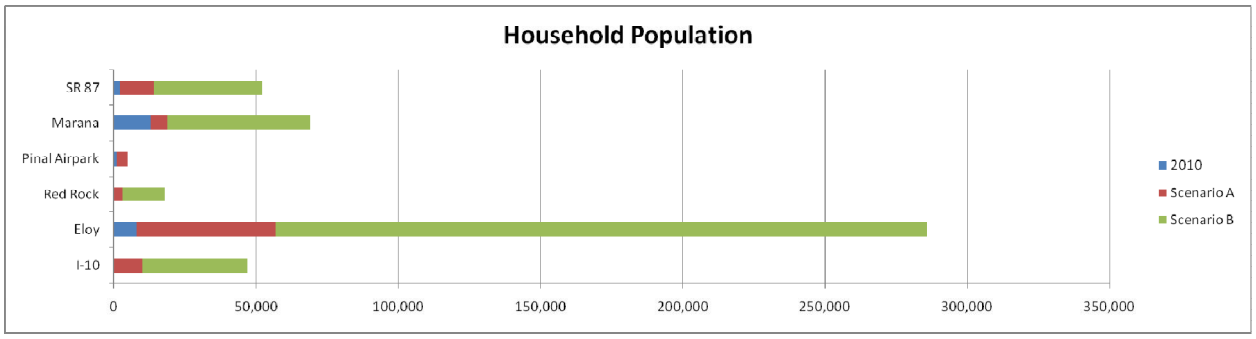
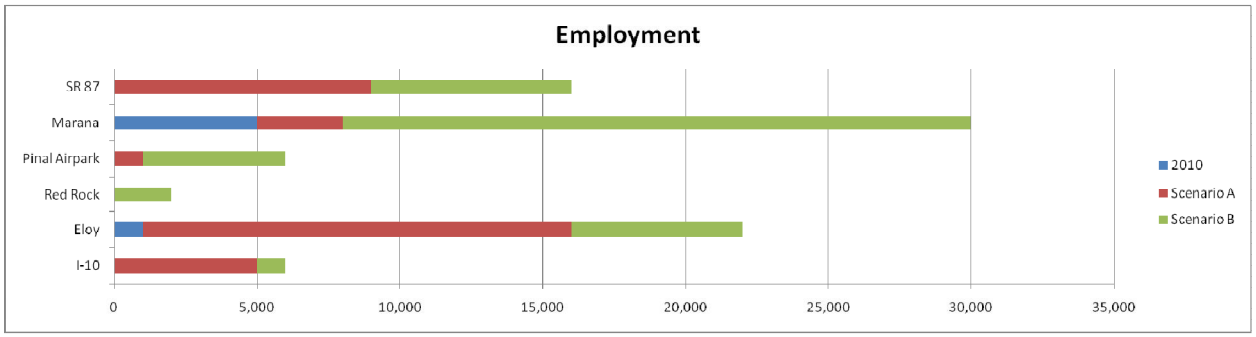


Figure 11: Employment by Scenario



The anticipated growth in the areas contiguous with existing development are consistent with the market demand assessment presented in Working Paper #2, noting that the market demand would naturally extend from the areas with existing infrastructure. As such, the areas of Eloy and Marana, as well as the corridor along SR 87, are most likely to experience near-term development.

4.0 FREIGHT OPPORTUNITIES

The study area includes many areas where freight-related businesses are established as well as opportunity areas for increased freight-based economic development. This section describes the potential for these freight opportunities.

4.1. Context: Freight Transportation Framework Study

In 2012, the Maricopa Association of Governments (MAG) completed a regional study for the Sun Corridor in concert with two other Planning Agencies: Pima Association of Governments (PAG) and Central Arizona of Governments (CAG). The study, known as the *Freight Transportation Framework Study*, included five focus areas in Pinal County that were identified by County staff as opportunity sites. The five areas included:

- Pinal Airpark (included within this study's Pinal Airpark focus area)

- La Palma (AZ 87 & AZ 287) (north of study area)
- I-8/I-10 Interchange (just west of study area)
- Casa Grande (AZ 84 & AZ 387) (just west of study area)
- Magma Rail Road (north of AZ 287 & west of AZ 79) (north of study area)

The 2012 MAG study focus areas were evaluated against qualitative and quantitative screening criteria, including distance, economic value, demographic and land use performance measures. The focus areas were ranked, with higher screening results for Pinal Air Park and the lands surrounding the Interstate-8 and Interstate-10 interchange.

Freight related land use opportunities were defined through the creation of supply chain facility typologies and associated location principles. Four typologies were defined in the 2012 MAG study, relevant descriptions of these typologies are excerpted below.

- *Import Center: As products enter the country, an import center stages them for inland distribution. Possible functions of an import center include redirection of goods to the precise markets currently demanding them; combining goods from multiple sources into load sets for individual stores and customers (referred to as deconsolidation and consolidation); changing modes (e.g., to transfer goods from rail to truck, or to expedite a shipment through forwarding it by air); and processing goods via packaging, labeling, or more complex preparation. Distinguishing principles for an Import Center are:*
    - *Sites should be close to the international gateway so that goods may be accessed as soon as possible;*
    - *Sites benefit from being within an anchor market providing opportunities for immediate local distribution;*
    - *Locations should have strong connections to the highway system for regional and national distribution, and be in reach of air service and other modal options;*
    - *The labor pool should find warehouse wages (roughly $14/hour) attractive, and have a reasonable commute to work;*
- *Manufacturing and Local Distribution Center: Facility functions are production, storage, and direct distribution (with little intermediate staging in the local area). Distinguishing principles for a Manufacturing and Location Distribution Center are:*

- *Sites focus closely on the population: for proximity to labor in the case of manufacturing, and for proximity to consumers for distribution;*
- *A comprehensive and efficient highway network is necessary in all directions;*
- *Air service is essential for manufacturing supplies and distribution;*
- *Labor requirements are diverse: manufacturing process and management skills necessitate tertiary educated personnel with advance technical and/or managerial skills demanding higher pay, while distribution can range from relatively demanding logistical work in a production environment, to relatively simple warehousing and trucking for local consumption.*

- *Mixing Center: Products traveling from sources all over the country and world may be staged for destination markets in a mixing center, which combines the characteristics of an import center with forward distribution. The essential functions of a mixing center are redirection, deconsolidation and consolidation, and modal change, along with processing and storage. Distinguishing principles for a Mixing Center are:*

  - *Access to international gateways, either by proximity or by location enroute to market;*
  - *Sites should be situated on the threshold of destination markets, and be enroute from domestic origins;*
  - *Access to an extensive highway network and broad availability of air service are critical, and rail options are desirable;*
  - *Locations should be anchored by substantial local demand;*
  - *Labor should find warehouse wages attractive and be able to commute to work, but the greater complexity of work also necessitates more sophistication and diversity in the labor pool;*
  - *Distance to the border should be sufficient to support round trips by Mexican truck fleets.*

- *Forward Distribution Center: As products travel across the country, a forward distribution center assembles goods from many long distance*

origins and local manufacturing and warehousing facilities, and stages them for delivery to major destination markets within reach of the center. Deconsolidation and consolidation are the key facility functions, but others include mode change (such as rail to truck), redirection, processing, and storage. Distinguishing principles for a Forward Distribution Center are:

- *Sites should be enroute between origins and destinations, thus requiring few additional travel miles to reach the facility;*
- *Locations should be near the threshold of destination markets so as to serve as jumping-off points, ideally within overnight truck service range (approximately 550 miles);*
- *Excellent general highway access and good modal alternatives are important;*
- *Immediate proximity to a large local anchor market improves location economics;*
- *The labor pool should find warehouse wages attractive and be able to commute to work.*

The location principles are summarized here, but should be referenced from the 2012 MAG *Freight Transportation Framework Study* for greater detail. *Import Centers* are generally located at international gateways so that goods can be accessed as soon as possible. For the 2012 MAG study, the only focus area that satisfied this principle was the Tucson International Airport. The *Manufacturing and Local Distribution Center* typology is heavily influenced by the proximity to skilled labor for manufacturing, and proximity to consumers for distribution services. Based on these principles, the La Palma and Pinal Air Park focus areas were most appropriate. Among many functions, *Mixing Center* facilities redirect, deconsolidate and consolidate goods, and are most appropriately located at the thresholds to destination markets, which in many cases are the interchanges of state highways and interstate freeways. In Pinal County, the focus areas located at the I-8/I-10 Interchange and in Casa Grande were identified as mixing center typologies. No *Forward Distribution Centers* were identifies in Pinal County.

Each of the typologies can be expanded to include transportation requirements based on the assumed operations for each facility. The 2012 MAG study acknowledged that transportation improvements were needed for these locations and typologies to be realized as economic development centers. However, that study did not identify specific transportation improvements for each focus area.

4.2. Freight Market

As part of this study, an assessment of development trends was prepared to inform the study team about specific land uses and potential absorption. This information is included in Working Paper #2. In general, the assessment identified that demand for industrial-based uses is higher than that assumed in the currently adopted AZTDM and the CAG 2040 RTP update. In order to capture these opportunities and realize higher absorption rates, Pinal County will depend on the quality of needed transportation infrastructure and the readiness of sites for development and business needs.

4.3. Freight-related Development Opportunities

Building on the *Freight Transportation Framework Study* and Working Papers #1 and #2, freight-related development opportunities have been identified based on information provided by County staff and data analysis. Additionally, and consistent with the methodology for the *Freight Transportation Framework Study*, significant freight-related opportunities are most likely near the interstate and state highway network. Within the study area, Interstate 10, Interstate 8 and State Route 87 are the appropriate corridors to expand existing freight-related services and create new services. Along these corridors there are four distinct opportunity subareas, as described below.

- Interstate 10 Corridor: The portion of the corridor located between Sunshine Boulevard and Sunland Gin Road in Eloy is unique in that it has access to skilled labor available from Casa Grande and Eloy, is roughly three-quarters of a mile deep, offers highway and rail servicing for large scale destinations, and is located at a significant interstate highway interchange. This particular area is unique based on the existence of parallel roadway and rail facilities that can be accessed and loaded separately. This allows for additional roadway network expansion and railway spur extensions without modal conflict. Based on the proximity to the interchange, this subarea could complement a broad-based mixing center facility type presented in the *Freight Transportation Framework Study.* The risk to this subarea is development in a piecemeal pattern that does not take significant advantage of the interstate network proximity or parallel modes and transportation facilities. This area should be considered for high value regional freight-related industries.

- Red Rock Classification Yard: Situated on the north side of Interstate-10, just south of Picacho Peak, lies the proposed Red Rock Classification Yard that is planned to contain approximately seven (7) mile long rail classification yard for rail operations. In addition to the rail operations, it is possible that other freight-related industries could locate in the area if they can benefit from the proximity of the new facility. However, there are a number of challenges to this area for

land development. This would include the proximity to the Central Arizona Project (CAP), transportation access and circulation, and environmental impacts related to the proximity to natural features, topography and view sheds.

- State Route 87: A large area of land in the City of Coolidge, located east of State Route 87 and north of Houser Road is envisioned for significant freight related development. This area is well positioned to contribute to the mixing center facility type due to its nexus to Interstate 10 and State Route 87. Based on the proximity of skilled labor and transportation infrastructure, this subarea could also contribute to a manufacturing and local distribution center. The particular area is owned by a single entity and is actively planning freight-based development and business creation.

- Pinal Air Park: The existing facility is planned for expansion of development and employment opportunities; the Town of Marana has prepared a master plan for the facility. Pinal Air Park is located along the southern boundary of Pinal County, west of Interstate 10. More broadly, it is between Tucson International Airport (TIA) and the interchange of Interstates 10 and 8, with the Union Pacific rail line operating adjacent to the east side of Interstate 10. This location, coupled with the extensive planning for the Air Park, and the assets of the existing facility, make this a viable freight-related development opportunity that can expand job growth through aviation, logistics and manufacturing.

4.4. Transportation Issues

The existing roadway infrastructure is a significant barrier to achieving desirable market-based freight-related opportunities. Private sector freight users require redundancy in the trunk transportation network to minimize risk of delay times. Transportation network improvements will be addressed in Working Paper #4 and address connectivity and access, transportation network design, access management principles, and character of the right of way.

5.0 NEXT STEPS

This working paper documents the development of the socioeconomic conditions of Scenario B. The population and employment in Scenario B, as well as the understanding of freight-related opportunities, will be utilized as the basis for identifying transportation recommendations in Working Paper #4. Additional policy and programming related recommendations will be identified as part of Working Paper #5.

APPENDIX

Scenario Model Inputs

This section describes the primary inputs for the future demographics region wide and within the study area. Input from Pinal County, City of Eloy and the Town of Marana guided the methods to identify development potential and build the scenario.

- Jobs and Employment: Locations included a mix of zoned and proposed warehousing and distribution centers with the Pinal County portion of the study area. In Marana, employment centers include a range of retail and commercial spaces that are anticipated to partially develop between now and 2040. The Town also tracks the estimated development potential after year 2040. For all locations, if the development was identified as entitled, it was included in the scenario. For Pinal County, a select number of proposed and zoned warehouse and distribution centers are not entitled, however as the locations are active planning and zoning cases, they were included in the scenario. When employment projections were available the number of new jobs was added to the scenario. In order to complete estimates, the square footage of future built space was applied as a ratio to convert development to jobs. If building square footages were unknown, the median value for employees per acre was utilized. Based on the information provided, 3.2 employees per acre represented the median.

- Households: More than 350 entitled developments exist throughout Pinal County. While 113 of the developments are located within the Study Area, impacts to the transportation network will occur due to the travel characteristics and travel markets in the larger region. Due to these factors, the scenario includes the additional housing units or households anticipated as development is built and occupied. New households are indentified by the number of units that are presently built in comparison to the number of units within the entitlement. All existing units and new units were included in the scenario for future households.

- Population: New residents are a derived factor based on new housing units and households. In Eloy, 2010 Census demographics indicate that there are 3.22 occupants per household. Nationally, each housing unit on average contained 2.58 occupants in 2010 while in Western states, 2.74 occupants is the average in 2010 Census statistics. The anticipated form of new development in Eloy will include age-restricted communities and trend toward 2.0 occupants per household and below. However, the demographics for the existing community and national trends for young adults to remain in place suggest that the existing trend is the most suitable assumption for future occupancy ratios. In Marana, the

community profile and Census demographics indicate that 2.74 occupants per household is a suitable assumption for scenario planning purposes. This assumption tracks closely with national and regional trends for Western states.

Detailed Model Elements

While the three primary data elements of jobs and employment, households, and population serve as the primary planning scenario inputs, to understand the impacts to the transportation system additional steps were required. This section describes the technical steps to translate the scenario inputs into a format appropriate for the Arizona Statewide Travel Demand Model. This study utilizes methodologies consistent with concurrent modeling efforts utilized on other projects throughout the region and state.

Detailed Job Classifications

The model requires the disaggregation of jobs by industry and employment type. Research shows that employment classifications are a good indicator of travel demand. The existing travel model utilizes a combination of NAICS (North American Industry Classification System) to aggregated job types.

The relevant relationship to AZTDM employment sectors, listed first, to NAICS codes, listed as bullets, are as follows:

Agricultural employment
- 11 Agriculture, Forestry, Fishing and Hunting

Construction employment
- 23 Construction

Health care employment
- 62 Health Care and Social Assistance

Leisure employment
- 71 Arts, Entertainment, and Recreation
- 72 Accommodation and Food Services
- 22 Utilities

Manufacturing employment
- 31-33 Manufacturing

Mining employment

- 21 Mining, Quarrying, and Oil and Gas Extraction

Retail employment

- 44-45 Retail Trade

Service employment

- 51 Information
- 52 Finance and Insurance
- 53 Real Estate and Rental and Leasing
- 54 Professional, Scientific, and Technical Services
- 55 Management of Companies and Enterprises
- 56 Administrative and Support and Waste Management and Remediation Services
- 61 Educational Services
- 81 Other Services (except Public Administration)
- 92 Public Administration.

Wholesale employment

- 42 Wholesale Trade
- 48-49 Transportation and Warehousing

The model requires regional planners to document anticipated development by detailed employment groupings. The study scenarios utilized the best available information to approximate potential employment distributions across industry sectors.

Detailed Population Characteristics

Population characteristics are straightforward. The values by analysis zone roll up into one number based on the sum of the housing characteristics described in the next section.

Detailed Housing Characteristics

Census demographics are closely reported on a household unit basis and the AZTDM utilizes these inputs to forecast travel demand. The household profile determines the population total, with many sub-measures that describe housing in detail.

The detailed analysis utilized to develop the proposed scenario for this study required broad assumptions on the housing profile sub-categories listed below.

- Dwelling Units
- Dwelling Units Seasonal
- Count of Vehicles
- Count of Households
- Total Household Income
    - Resident households with income $0-25k (2008 income)
    - Resident households with income $25-45k (2008 income)
    - Resident households with income $45-65k (2008 income)
    - Resident households with income $65-100k (2008 income)
    - Resident households with income $100k+ (2008 income)

The sub-categories were estimated utilizing the equivalent percentage distribution of existing households. Therefore, as an example, if twenty percent of dwelling units were occupied seasonally, twenty-percent of households in the future scenario was assumed to be occupied seasonally.

There are instances when analysis zones in the baseline scenario did not contain any existing households and the number of households corresponded entirely to the proposed scenario. In these cases, a representative zone provided an approximation and distribution of the housing characteristics and sub-categories.

In developing the proposed scenario for this study, the housing assumptions were examined at a TAZ level for all 3,438 travel analysis zones in the CAG model to ensure consistency with the anticipated development. In cases where the total anticipated housing units exceeded those in the baseline scenario, the household values were updated to reflect anticipated development.

Identifying Anticipated Development

This section explains the methodology of disaggregation of development information into the TAZs utilized by the AZTDM. The proposed scenario translated the anticipated development proportionally into the TAZs of the model.

The analysis zones utilized in the CAG 2040 model added additional detail and divisions to the 2010 base year model. The CAG 2040 scenario takes a proportion of the zone in 2010 and applies that same proportion to the zones in 2040. This step serves to translate information from base year to future year conditions.

For this study's proposed scenario, all development projects were mapped using GIS. As development often spans multiple analysis zones, the percentage of the development area that covers the first TAZ and a percentage of the development that extends into the second TAZ were indentified. Based on this method, the anticipated number of new

units and jobs were added proportionally to the respective zones. This step was repeated for all entitled developments throughout Pinal County and Northern Pima County. Once these steps were completed, the study team reviewed the future demographic trends.